

The opinion in support of the decision entered today was not written  
for publication and is not binding precedent of the Board.

Paper No. 36

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte LOWELL D. BOK and FRANK D. EDMISTEN

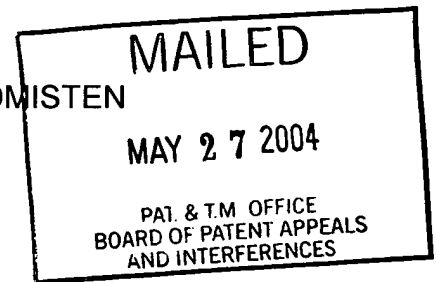
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Appeal No. 2004-0722  
Application No. 09/449,034

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HEARD: May 4, 2004

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Before ABRAMS, STAAB, and NASE, Administrative Patent Judges.

STAAB, Administrative Patent Judge.

DECISION ON APPEAL

Lowell D. Bok and Frank D. Edmisten (appellants) appeal from the examiner's final rejection of claims 1-5, 11 and 13-16, all the claims currently pending in the application.

Appellants' invention pertains to a multi-disk brake assembly for used in aircraft. It is known in the aircraft brake art to provide a brake disk stack comprised of interleaved rotor and stator disks, where the rotor and stator disks are alternatively splined to a rotatable wheel and a non-rotatable torque tube, respectively. An end plate is provided at one end of the stack, and an axially movable pressure plate is provided at the other end of the stack, whereby upon application of force to the pressure plate, the disks frictionally engage and provide braking activity to the aircraft. As explained in the "BACKGROUND OF THE INVENTION" section of the specification (pages 1-5), it is also known to provide a multi-disk aircraft brake assembly comprised of rotor and stator disks having different available wear portion thicknesses, whereby at a end of a first service run, the brake is overhauled and the disks having thinner wear portions are removed and replaced, while the disks having thicker wear portions are retained for further use.

As set forth on page 1 of the specification, appellants' invention is directed to a multi-disk aircraft brake assembly wherein

[t]he available wear portions of the rotors and stators have different wear thicknesses, so that the thickest disks in the stack are refurbished or replaced after three service runs. The mid-thickness disks are replaced or refurbished after two service runs and the thin disks are replaced or refurbished after one service run.

The references cited by the examiner in the final rejection as evidence of obviousness are:

Bok	4,742,895	May 10, 1988
Guichard, et al. (Guichard)	CA-2004091	May 29, 1990

Claims 1-5 stand rejected under 35 U.S.C. § 112, first paragraph, "as containing subject matter which is not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention" (answer, page 4).

Claims 1-5, 11 and 13-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Canadian Patent Application 2,004,091 to Guichard et al. (hereinafter, Guichard) in view of Bok '895.

Reference is made to appellants' main and reply briefs (Paper Nos. 28 and 31) and to the examiner's answer (Paper No. 29) for the respective positions of appellants and the examiner regarding the merits of these rejections.

#### Discussion

##### The Rejection under 35 U.S.C. § 112, first paragraph

The test for determining compliance with the written description requirement found in the first paragraph of 35 U.S.C. § 112 is whether the disclosure of the application as originally filed reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter, rather than the presence or absence of literal

support in the specification for the claim language. *In re Kaslow*, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983).

Claim 1 was amended during prosecution and is now directed to a brake disk assembly comprising an end plate, a pressure plate and brake disks axially aligned and disposed therebetween, "wherein said brake disks, end plate and pressure plate, *each* comprising of *disks* with wear faces having three different wear portions . . ." (emphasis added).

The examiner considers (answer, pages 4 and 9) that the above quoted portion of claim 1 reads as if the end plate, for example, is made up of more than one disk, which is clearly not the case. In response, appellant argues (main brief, page 10) that "[t]he language of the claims clearly states that the end plate and pressure plate are made of disks respectively which have a wear face which can have one of three different wear portions."

The examiner's point is well taken. The language in question of claim 1 clearly calls for *each* of the brake disks, end plate and pressure plate to comprise *disks* (in the plural) with wear faces. While appellants' original disclosure shows the interleaved stators 39 and rotors 44 as having a friction lining 42 [i.e., "disk"] on each annular surface, the end plate 36 and pressure plate 38 only have a friction lining 42 on one annular surface. Appellants' argument that the language of the claim 1 clearly states that the end plate and the pressure plate are made of disks *respectively* which have a wear face is simply wrong,

as claims 1-5 do not include, among other things, the word "respectively" argued by appellants.

In light of the foregoing, we shall sustain the standing rejection of claims 1-5 under 35 U.S.C. § 112, first paragraph, as failing to satisfy the description requirement found in that paragraph of the statute.<sup>1</sup>

The Rejection under 35 U.S.C. § 103

Independent claim 16 is directed to a brake disk assembly comprising an end plate, a pressure plate, interleaved rotors and stators disposed between the end plate and pressure plate, wherein the rotors and stators comprise brake disks having wear faces, said brake disks comprising

first thickness brake disks each having an initial first available wear portion on each wear face, second thickness brake disks each having an initial available wear portion on each wear face which is two thirds of the available wear portion on each wear face of the first thickness brake disks, and third thickness brake disks each having an initial available wear portion on each wear face which is one third of the available wear portion on each wear face of said first thickness brake disks . . . .

Thus, claim 16 requires a *plurality* of first thickness brake disks, a *plurality* of second thickness brake disks having an available wear portion on each wear face which is two thirds of the available wear portions on each wear face of the first thickness brake disks, and a *plurality* of third thickness brake disks having an available wear portion on

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<sup>1</sup>It also appears that claims 1-5 do not satisfy the accuracy requirement found to be implicitly contained in the second paragraph of 35 U.S.C. § 112. See *In re Knowlton*, 481 F.2d 1357, 1366, 178 USPQ 486, 492-93 (CCPA 1973) (in order to satisfy the second paragraph of § 112, a claim must accurately define the invention in the technical sense).

each wear face which is one third of the available wear portions on each wear face of the first thickness brake disks. Independent claims 1, 11, and 13 are similar in that they each also requires a *plurality* of first thickness disks, a *plurality* of second thickness disks, and a *plurality* of third thickness disks.

Guichard, the examiner's primary reference, discloses a brake disk assembly comprising a retaining plate 4 rigidly connected to a non-rotatable guide 1, a support plate 5 mounted to slide on the non-rotatable guide, a plurality of rotors R1 to R4 splined to a rotatable wheel guide 2, and a plurality of stators S1 to S5 splined to the guide 1 and interleaved with the rotors. Figure 1 shows the brake disk assembly at the beginning of a first service run and Figure 2 shows the brake disk assembly at the end of the first service run. As explained on pages 3-5 of Guichard's specification, and with reference to Figure 1, the status of the rotors and stators at the beginning of a first service run is as follows: rotors R1 and R2 and stators S1 and S2 each have a thickness equal to  $E + 4e$ ,<sup>2</sup> stator S3 has a thickness equal to  $E + 3e$ , rotors R3 and R4 and stator S4 each have a thickness equal to  $E + 2e$ , and stator S5 has a thickness equal to  $E + 1e$ . With reference to Figure 2, the status of the rotors and stators at the end of the first service run is as follows: stator S1 has a thickness equal to  $E + 3e$ , rotors R1 and R2 and stator S2 each have a thickness equal to  $E + 2e$ , stator S3 has a thickness equal to  $E + 1e$ , and rotors R3 and R4 and stators S4 and S5 each have a thickness equal to  $E$ . At the end of the first service run, it

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<sup>2</sup>E is the minimum thickness of the disk after wear and e is the thickness of the material worn down, on each side, from rubbing contact during a service run.

is possible to refurbish the assembly and return it to its Figure 1 status as follows: rotors R3 and R4 and stators S4 and S5 each having a thickness equal to  $E$ , being fully worn, are removed, stator S3 having a thickness equal to  $E + 1e$  is moved to the position previously occupied by stator S5, stator S1 having a thickness equal to  $E + 3e$  is moved to the position previously occupied by stator S3, stator S2 having a thickness equal to  $E + 2e$  is moved to the position previously occupied by stator S4, rotors R1 and R2 each having a thickness equal to  $E + 2e$  are moved to the positions previously occupied by rotors R3 and R4 respectively, and new rotors and stators each having a thickness equal to  $E + 4e$  are placed at the positions previously occupied by rotors R1, R2, S1 and S2. Thus, stator S1 lasts through three service runs, being located at position S1 for the first run, at position S3 for the second run, and at position S5 for the third run, rotors R1 and R2 each last through two service runs, being located at positions R1 and R2 for the first run and at positions R3 and R4 respectively for the second run, and stator S2 also lasts through two service runs, being located at position S2 for the first run and at position S4 for the second run.

From the above, it is clear that in the Figure 1 configuration Guichard's brake comprises four disks (S1, S2, R1 and R2) of thickness  $E + 4e$ , one disk (S3) of thickness  $E + 3e$ , three disks (S4, R3 and R4) of thickness  $E + 2e$ , and one disk (S5) of thickness  $E$ , while in the Figure 2 configuration Guichard's brake comprises one disk (S1) of thickness

$E + 3e$ , three disks (S2, R1 and R2) of thickness  $E + 2e$ , one disk (S3) of thickness  $E + 1e$ , and three disks (S4, R3 and R4) of thickness  $E$ .

In rejecting the appealed claims under 35 U.S.C. § 103(a), the examiner has characterized Guichard's retaining plate 4 and stator S5 as corresponding to the claimed end plate, and Guichard's support plate 5 and stator S1 as corresponding to the claimed pressure plate. In attempting to read the claimed subject matter on Guichard's brake, the examiner considers that the various stators and rotors thereof

comprise disks of three different wear portions whereby disks of a first thickness S1, R1, R2 (thickness =  $E + 4e$ ) have an initial wear portion ( $4e$ ), disk of a second thickness S3 (thickness =  $E + 3e$ ) have approximately two thirds ( $3e$ ) of the initial wear portion of the first thickness disk, and disk of a third thickness S5 (thickness =  $E + e$ ) have approximately one third ( $e$ ) of the initial wear portion of the first thickness disk, the brake disk assembly including disks of a first, second, and third thickness, whereby at an overhaul [Guichard's Figure 2 configuration] the available wear portion of the first thickness disk [S1, R1 and/or R2] is approximately equal to the initial available wear portion ( $3e$ ) of the second thickness disk [S3], and the available wear portion of the second thickness disk [S3] is about equal to the initial available wear portion ( $e$ ) of the third thickness disk [S5], and the available wear portion of the third thickness disk [S5] is substantially fully worn, whereby the third thickness disk [S5] is removed and replaced with disk of a first [S1, R1 and/or R2], second [S3] or third [S5] thickness . . . . [Answer, page 5.]

The examiner concedes (answer, page 6) that, among other things, Guichard "does not show in the two figures that the second and third thickness disks [S3 and S5, respectively] each comprise a plurality of disks." The examiner does *not* rely on the secondary reference to Bok '895 to account for this deficiency. Instead, the examiner takes the position (answer, page 6) that



[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the second [S3] and third [S5] thickness disks of . . . [Guichard] with a plurality of disks, in view of the teaching in . . . [Guichard] of a plurality of disks [S1, R1, R2] of the first thickness, in order to provide a means of increasing the total braking capacity of the assembly.

The examiner's position is not well taken. The fact that in the Figure 1 configuration Guichard's brake includes a plurality of disks (S1, R1, R2) of a first thickness  $E + 4e$ , or for that matter a plurality of disks (S4, R3, R4) of thickness  $E + 2e$ , does not in our view amount to a teaching or suggestion that Guichard's brake could be reconfigured to include a plurality of disks S1 or a plurality of disks S3. Rather, the provision of additional stators S1 and S3 in Guichard would run counter to Guichard's teachings. In this regard, the stators S1 and S5 of Guichard are unique in the sense that, unlike the other rotors and stators, they are not subject to wear on both sides during a service run. Moreover, the stator S3 is uniquely tied to stators S1 and S5 in the sense that stator S3 represents the midpoint in the life of an S1 stator as it evolves into an S5 stator. This being the case, there is no logical reason for providing more than one each of the stators S1, S3 and S5 in Guichard. Stated differently, if an additional stator S1 were to be provided in Guichard, it would appear logical that an additional adjacent rotor would also be added in order to provide appropriate functionality to the added stator. Otherwise, the added S1 stator would result in the inappropriate placement of two stators directly adjacent one another. However, the additional of stators and rotors in pairs would merely result in increasing the number of stators and rotors that function like stator S2 and rotors R1 and R2, and as

such would not result in a plurality of second thickness disks and a plurality of third thickness disks as now claimed.<sup>3</sup> We therefore are in agreement with appellants' arguments on page 14 of the main brief to the effect that Guichard does not suggest modifying the brake thereof to include a *plurality* of disks of a second thickness and a *plurality* of disks of a third thickness.

We have also reviewed the Bok '895 reference additionally relied upon by the examiner in the standing § 103 rejection and find that it does not make up for the deficiencies of Guichard discussed above. Bok '895 discloses a brake system having a first plurality of disks having an available wear portion of a first thickness and a second plurality of disks having an available wear portion of a second thickness greater than the first thickness. As explained at column 1, line 50, to column 2, line 2, and column 5, lines 15-36, at the end of a first service run when the wear portion of the first plurality of disks is fully worn, the first plurality of disks is replaced by a new plurality of disks having an available wear portion of a third thickness greater than the thickness of the available wear portion of the second plurality of disks at the end of the first service run. Since Bok '895 only discloses a system employing disks of two wear thicknesses at any one time, it cannot be said that it teaches or suggests a brake arrangement that includes a *plurality* of

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<sup>3</sup>A review of the three rotor and four stator disk embodiment disclosed on page 6 of Guichard yields a similar result.

disks of a first thickness, a *plurality* of disks of a second thickness, and a *plurality* of disks of a third thickness as required by the claims.

For these reasons, we shall not sustain the standing rejection of the appealed claims under 35 U.S.C. § 103(a).

Summary

The rejection of claims 1-5 under 35 U.S.C. § 112, first paragraph, is affirmed.

The rejection of claims 1-5, 11 and 13-16 is reversed.

The decision of the examiner finally rejecting the appealed claims is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART



NEAL E. ABRAMS  
Administrative Patent Judge



LAWRENCE J. STAAB  
Administrative Patent Judge



JEFFREY V. NASE  
Administrative Patent Judge

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Application No. 09/449,034

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